Permit No.: 73-10
Company Name: American Process Incorporated
Engineer: Andrew Drury
Last Updated: September 7, 2010

SOURCE

American Process Incorporated (API) intends to build a facility to produce up to 1.17 million gallons of denatured ethanol per year. The API facility would be adjacent to the existing Decorative Panels International (DPI) hardboard manufacturing facility. As discussed in the General Comments, API and DPI are considered to be the same stationary source.

As a result of their operations, DPI produces a wastewater stream containing wood sugar (the Seal Water Chest Overflow). This wastewater stream is currently sent to DPI's wastewater treatment plant (WWTP) for treatment. API proposes to use the wood sugar in this wastewater stream as the raw feed for the ethanol production process, using fermentation and distillation/purification processes to convert the wood sugar from a waste material into fuel grade ethanol.

API intends to purchase the WWTP from DPI, which includes a sludge dryer used to dry sludge generated in the WWTP. API expects use of the sludge dryer will be greatly reduced, and possibly be totally eliminated, while the wood sugar wastewater stream is used as feed to the ethanol process.

This permit covers the following emission units and flexible groups:

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)
EULIME	Lime storage and handling. Lime is delivered by truck and transferred to a storage silo using the truck mounted blower. The silo is equipped with a passive vent filter to control emissions. The lime is fed directly to a slurry tank to produce a 30% lime slurry.
EUPRETREAT	Feedstock pretreatment: vapor compression evaporation (evaporator, compressor, heat exchanger) to increase the solids content, followed by sulfuric acid hydrolysis at elevated temperature, followed by vapor compression evaporation to increase the solids content. Acetic acid separation occurs in the two VCEs listed above. Potassium hydroxide is added to the separated stream to convert acetic acid to potassium acetate. Reverse osmosis separation is completed to concentrate the potassium acetate followed by vapor compression evaporation in a third VCE. All three VCEs exhaust through a single stack. Emissions are uncontrolled.
EUYEASTPROP	Yeast propagation system where yeast is propagated and fed to the fermentation system consisting of 850 gallon prep tank and one 21,300 gallon propagation tank. Emissions are controlled by the wet scrubber.
EUFERM	Fermentation process consisting of four 62,500 gallon fermenters and one 74,600 gallon beer well. Emissions are controlled by the wet scrubber.
EUBEERCOLUMN	The beer column is the first stage of the ethanol distillation system. The beer column separates the ethanol from the yeast and residual sugars. Emissions are controlled by the wet scrubber.

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)
EURECTIFIER	The rectifier column separates the ethanol from the water, producing a 95% ethanol, 5% water azeotropic mixture. Emissions are controlled by the wet scrubber.
EUMOLSIEVE	Two vapor phase molecular sieves to produce 200 proof ethanol. Emissions are controlled by the wet scrubber.
EUTANK1	1,500 gallon ethanol Shift Tank 1.
EUTANK2	1,500 gallon ethanol Shift Tank 2.
EUTANK3	1,040 gallon denaturant storage tank.
EUTANK4	14,830 gallon 200-proof ethanol product storage tank.
EUETHLOAD	Denatured ethanol truck load out. Denaturant is added to the 200-proof ethanol using an in-line pump skid immediately before loading into the trucks. Emissions are uncontrolled.
EUSLUDGEDEHYDRTR	Paddle dryer, dries waste water treatment sludge. Controlled by a venturi scrubber, condenser, and EUBOILER#1 and EUBOILER#2. Both boilers are located at, and operated by, Decorative Panels International (DPI).

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGPROCESS	Ethanol fermentation and purification equipment vented to the process wet scrubber.	EUYEASTPROP, EUFERM, EUBEERCOLUMN, EURECTIFIER, EUMOLSIEVE
FGNSPSVVa	All pumps, valves, and pressure relief devices in light liquid and heavy liquid service; all valves and pressure relief devices in gas/vapor service; each sampling connection; and each open ended valve or line and all associated closed vent systems and control devices.	All equipment subject to 40 CFR 60 Subpart VVa
FGMON	Miscellaneous organic chemical manufacturing process units (MCPU) that are located at, or are part of, a major source as defined in section 112(a) of the Clean Air Act and that meet all the criteria specified in 40 CFR Part 63, Subpart FFFF (40 CFR), 63.2435. Specified processes are further defined in 40 CFR 63.2440.	All equipment subject to 40 CFR 63 Subpart FFFF
FGAPIFACILITY	All process equipment source-wide at the American Process Incorporated facility including equipment covered by other permits, grand-fathered equipment and exempt equipment.	All emission units at the American Process Incorporated facility.

MONITORING

Monitor the amount of lime transferred to the lime storage silo.

Monitor the amount of ethanol and denaturant loaded into trucks.

Monitor the sludge dryer venturi scrubber water flow rate and condenser water flow rate.

Monitor the wet scrubber water flow rate.

Monitoring as required by NSPS VVa and the MON MACT.

BYPASS
No control device bypass is allowed.

WASTE DISPOSAL
All waste is expected to be properly disposed of.

GENERAL COMMENTS
SIP Rules: 205, 301, 331, 702, 910, 911, 1803, 1804
Non SIP Rules: 225, 901, 40 CFR 52.21(c) & (d), 40 CFR 40 Subparts A and VVa, 40 CFR Part 63 Subparts A and FFFF

This permit was subject to the public comment process because the DPI facility is considered to be controversial, in part due to odors generated from the WWTP.

********** KEY ASPECTS OF THE REVIEW
** Stationary source determination**
In order to determine what rules and regulations apply to the proposed API facility, the stationary source needs to be identified. Are API and DPI separate stationary sources, or one single stationary source? API proposed in the application that the two are separate sources.

For PSD, Rule 2801 contains the definitions needed to identify the stationary source. Per Rule 2801(rr), “stationary source” means any building, structure, facility, or installation which emits or may emit a regulated new source review pollutant.

Per Rule 2801(g), “Building, structure, facility, or installation” means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on 1 or more contiguous or adjacent properties, and are under the control of the same person, or persons under common control, except the activities of any vessel. Pollutant-emitting activities are part of the same industrial grouping if they have the same 2-digit major group code associated with their primary activity. Major group codes and primary activities are described in the standard industrial classification manual, 1987.

For Title V, Rule 119 defines a stationary source as follows: "Stationary source" means all buildings, structures, facilities, or installations which emit or have the potential to emit 1 or more air contaminants, which are located at 1 or more contiguous or adjacent properties, which are under the control of the same person, and which have the same 2-digit major group code associated with their primary activity. In addition, a stationary source includes any other buildings, structures, facilities, or installations which emit or have the potential to emit 1 or more air contaminants, which are located at 1 or more contiguous or adjacent properties, which are under the control of the same person, and which have a different 2-digit major group code, but which support the primary activity. Buildings, structures, facilities, or installations, are considered to support the primary activity if 50% or more of their output is dedicated to the

primary activity. Major group codes and primary activities are described in the standard industrial classification manual, 1987. Notwithstanding the provisions of this subdivision, research and development activities, as described in R 336.1118, may be treated as a separate stationary source, unless the research and development activities support the primary activity of the stationary source.

To summarize, there are three criteria that must all be met to determine if API and DPI are a single stationary source for PSD and Title V:

1. Do they belong to the same industrial grouping?

No, they are not in the same industrial grouping. However, AQD Operational Memorandum #11 and US EPA guidance address the question of support facilities. The August 7, 1980 Federal Register specifies that "one source classification encompasses both primary and support facilities, even when the latter includes units with a different two-digit SIC code. Support facilities are typically those which convey, store, or otherwise assist in the production of the principle (sic) product."

AQD has determined that, because all of the raw feed to API will come from DPI (the Seal Water Chest Overflow), DPI is a support facility to API. Without the Seal Water Chest Overflow, API cannot operate. If, in the future, API acquires other raw material feed streams, this question can be re-visited.

Therefore, the first criterion is met.

2. Are they located on 1 or more adjacent properties?

The two facilities are clearly adjacent, as API will be purchasing the WWTP from DPI and constructing the ethanol production facility on property that is currently owned by DPI, and will be adjacent to DPI when the sale of the WWTP occurs.

Therefore, the second criterion is met.

3. Are they under the control of the same person, or persons under common control?

While the ownership of the two companies will be different, according to API, there are clearly areas where the two companies will exert operational control over each other, as follows:

a. API will own and operate the WWTP that only treats wastewater from DPI, and this WWTP is currently the only option for DPI to dispose of their wastewater. If API shuts down the WWTP, DPI will be forced to shut down. Thus, API can exert operational control over DPI. If a contractual agreement exists that requires API to operate the WWTP, then DPI would exert control over API.

b. As discussed above, the Seal Water Chest Overflow is currently the only raw material feed for API's ethanol production process. If DPI shuts down, API cannot operate. Therefore, DPI can exert control over API.

c. API has not applied for boilers to generate steam, and will be dependent on DPI to provide steam for its operations, allowing DPI to exert operational control over API by not providing steam.

d. DPI's boilers act as pollution control devices for the sludge dryer that will belong to API. If DPI does not operate the boilers, the sludge dryer would not be able to operate, allowing DPI to exert operational control over API.

Therefore, the third criterion is met.

Since all three criteria have been met, based on the API facility as presented in the permit application, AQD determined that API and DPI constitute a single stationary source for the purposes of PSD and Title V.

For 40 CFR Part 63, an "affected source" has only two criteria, "within a single contiguous area and under common control." These are the same as criteria 2 and 3 above, so AQD also determined that API and DPI constitute a single stationary source for the purposes of the 40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations.

There are three primary implications:
1. Since DPI is a major source of criteria pollutants, the emissions from the API facility need to be evaluated to determine if they trigger a major modification for PSD.
2. Since DPI is a major source of criteria pollutants and HAPs, API will have to obtain an ROP. This will likely be accomplished by adding a section to DPI's existing ROP.
3. Since DPI is a major source of hazardous air pollutants (HAPs), API will have to comply with the Miscellaneous Organic NESHAP.

**** PSD applicability**
DPI is an existing major stationary source of criteria pollutants (potential to emit greater than 250 tons per year). The following table lists DPI's actual emissions in 2008, as reported to the Michigan Air Emissions Reporting System:

Pollutant	Tons per year (tpy)
Carbon Monoxide (CO)	246
Nitrogen Oxides (NOx)	340
Sulfur Dioxide (SO_2)	843
Volatile Organic Compounds (VOC)	105

Since DPI's actual emissions of NOx and SO_2 exceed the PSD major stationary source threshold, the potential emissions must also be above the threshold.

Since DPI and API have been determined to be a single stationary source, it is necessary to determine if the proposed API facility would constitute a major modification to the major stationary source.

* Define the project
The first step is to define the project. The project consists of all emission units undergoing a "physical change or a change in the method of operation."

1. New equipment
   Clearly, the new equipment that API plans to install is undergoing a physical change (it does not yet exist) and is therefore part of the project.

2. DPI boilers

The API project will impact the boilers at DPI in several ways.

a. By using the Seal Water Chest Overflow stream from DPI to produce ethanol, API will reduce the amount of sludge produced in the WWTP because this stream contains the majority of the biological oxygen demand (BOD) loading to the WWTP. As a result, there will be less sludge available to be burned in the boilers (4.1 bone dry tons per day instead of 12.9 bone dry tons per day, according to API). This reduction in sludge will have to be made up with another fuel.

   This does not constitute a physical change or a change in the method of operation because the boilers can currently accommodate, and are allowed to burn in sufficient quantities, other fuels. In addition, DPI has always had the option of burning reduced amounts of sludge or no sludge at all in the boilers. Reducing the amount of sludge available for fuel in the boilers does not make the boilers part of the project.

b. API will utilize steam from the DPI boilers. API will also be returning a hot water stream to DPI which will reduce loading on the boilers to heat river water. Additionally, by using the Seal Water Chest Overflow stream from DPI to produce ethanol, API will reduce the amount of sludge produced in the WWTP; because of this reduced sludge production, API's operation will cause a reduction in steam requirements for operating the sludge dryer. Taking these three factors into account, API provided an energy balance for the boiler system. For a given level of production at DPI, the energy balance shows an overall reduction in steam production required from DPI's boilers while the API facility is operating. This could potentially allow the boilers to provide more steam for DPI's production than would be possible without the API facility operating.

   According to DPI, the boilers are not a bottleneck in the production process. The press equipment limits the production capacity of the plant. So, even though operation of the API facility will reduce the amount of steam required from the boilers for a given level of production at DPI, this will not result in any additional production capacity for DPI and will therefore not result in any increase in emissions from DPI or the boilers.

   The use of steam from DPI's boilers, return of hot water to DPI, and reduction in steam use for the sludge dryer do not make the boilers part of the project.

   (Note that the hot water from API will offset use of river water at DPI, which must be heated prior to use, so this is a water savings in addition to reducing the steam production.)

2. WWTP

   The API project will impact the WWTP by reducing the BOD loading on the system. In effect, the API facility will be a pre-treatment system for the WWTP, reducing the BOD input to the WWTP and thereby reducing emissions from the WWTP. This will potentially allow the WWTP to handle a larger volume of wastewater from DPI.

   According to DPI, the WWTP is not a bottleneck in the production process. The press equipment limits the production capacity of the plant. So, even though operation of the API facility could allow the WWTP to handle a larger volume of wastewater, this will not result in any additional production capacity for DPI and will therefore not result in any increase in emissions from DPI or the WWTP.

In conclusion, the only emission units at the stationary source that are undergoing a “physical change or a change in the method of operation” are the new emission units at the API facility. Even though operation of the API facility may make more steam available for DPI’s production and may allow the WWTP to handle a larger volume of wastewater, DPI will not be able to increase production beyond what they were already able to accommodate because the press equipment limits the production capacity of the facility, not the steam supply or volume of wastewater that can be treated.

* Project emissions
Once the project is defined, the emissions need to be estimated to determine if the project is a major modification.

For the API facility, the “actual to potential” test was used to determine PSD applicability. This test compares the baseline actual emissions for the project to the potential emissions for the project.

For new equipment, Rule 1801(b)(iii) states that the baseline actual emissions shall be equal to zero.

The potential to emit for the API facility is based on either permit limits or, in the absence of permit limits, the unrestricted emissions from all equipment operating at full capacity. The table below lists the API potential emission rates and the PSD significant emission rates for the criteria pollutants:

Pollutant	Potential Emissions (tpy)	PSD Significant Emission Rate (tpy)
Nitrogen oxides (NOx)	NA	40
Carbon monoxide (CO)	NA	100
Volatile organic compounds (VOC)	7.83	40
Particulate matter less than 10 microns in diameter PM10	0.22	15
Particulate matter less than 2.5 microns in diameter PM2.5	0.2	10
Particulate matter (PM)	0.33	25
Sulfur dioxide (SO_2)	NA	40

As the table shows, the potential criteria pollutant emission rates from the API facility are below the PSD significant emission rates. Therefore, the addition of the API facility is not a major modification to the existing major source.

** **MACT applicability**
DPI is an existing major source of HAPs. In 2008, DPI report 32.22 tons per year of hydrogen chloride (the single largest HAP) and 49.26 tons per year of total HAPs to the Michigan Air Emissions Reporting System.

Therefore, API will have to comply with the Miscellaneous Organic NESHAP.

** **MACT DDDD**
DPI is subject to the Maximum Achievable Control technology Standards for Plywood and Composite Wood Products, 40 CFR 63 subpart DDDD. At the time the ROP was issued on December 17, 2009, DPI was not in compliance with this MACT. However, this does not prevent AQD from issuing the permit for API.

DPI is not located in a criteria pollutant non-attainment area, so the non-attainment NSR regulations do not prevent issuance of the permit.

None of the emission units subject to the MACT are being modified.

AQD expects that all equipment included in the permit will be able to operate in compliance with the permit conditions and all other applicable rules and regulations.

**** Unique nature of the facility**
This is the one of the first cellulosic ethanol plants in Michigan. As a result, there is no emission data available for some of the processes at the plant. Therefore, engineering calculations and emission factors from corn-to-ethanol plants were used in an attempt to estimate emissions from this facility. These approaches should adequately address the emissions.

***** Sludge dryer**
DPI has a sludge dryer that is used to dry sludge from the WWTP. When API purchases the WWTP, the sludge dryer will transfer, as well. Therefore, the conditions for the sludge dryer are carried into API's permit without changes. Note the emissions from the dryer are controlled by the boilers at DPI. With the operation of the ethanol process, API expects much less sludge to be produced, which should reduce the usage of the sludge dryer.

********* Process and control equipment and emission estimation methods**
See Appendix B of the application for detailed emission calculations.

**** Feedstock pre-treatment**
The Seal Water Chest Overflow stream, which contains wood sugar as well as acetic acid, will be received from DPI and filtered to remove suspended solids (fibers) from the wastewater. No air emissions are expected from filtration.

The filtered sugar stream will then go through a Vapor Compression Evaporation system (VCE) to increase the solids content to about 3.3% and remove about 75% of the acetic acid in the feed stream as condensate from the VCE.

The VCE consists of an evaporator, a compressor, and a shell and tube heat exchanger. Water and acetic acid are evaporated in the evaporator vessel. The vapor is compressed in the compressor; the compression heats the vapor which goes through the heat exchanger. Most of the vapor is condensed; a small amount of non-condensable gases is vented to atmosphere and contains a trace amount of acetic acid (<0.1 lb/hr). The heat from the compressor is used to heat the evaporator.

The concentrated sugar stream from the VCE will be hydrolyzed with heat and sulfuric acid to break the long chain sugars into single sugar molecules (monomeric sugar). The acetyl groups from the hemicelluloses are released, generating additional acetic acid. The lignin in the stream will condense and precipitate during hydrolysis. Immediately following hydrolysis, lime (calcium oxide) is added to neutralize the stream to a pH of 6. This will cause the sulfate ion from the

sulfuric acid to precipitate as gypsum (calcium sulfate). The hydrolysis is not expected to generate air emissions. The precipitated lignin and gypsum will be collected from the stream and sent through a filter press. The pressed mass can be disposed of in a landfill, land applied, or possibly sold to a lime kiln

* Note the 98% sulfuric acid tank is exempt per Rule 284(h). The tank will be equipped with a desiccant in the vent line to prevent water from entering the tank, which will also eliminate acid emissions from the tank.

* Note the lime used after hydrolysis will be delivered by truck and transferred to a storage silo using a blower mounted on the truck. The silo will be equipped with a passive vent filter. Lime will be fed directly to a slurry tank to produce a 30% lime slurry. Minimal emissions are expected from the lime handling.

The hydrolyzed monomeric sugar will go through a second VCE to further concentrate the solids to about 10.6% and remove about 74% of the acetic acid as condensate from the VCE. At this point, the monomeric sugar stream is ready for fermentation.

**** Potassium acetate production**
The acetic acid containing condensate streams from the first two VCEs will be mixed with potassium hydroxide, which will react with the acetic acid to produce potassium acetate salt, which will be concentrated to about 5% using reverse osmosis (RO) membranes. The RO membranes will also produce 140°C water, which will be recycled back to DPI's mill to reduce the amount of steam that DPI needs to generate.

The concentrated potassium acetate solution from the RO membranes will go through a third VCE and an accompanying finisher to produce a 50% (by weight) aqueous potassium acetate solution that will be sold as a deicer product. No emissions are expected from potassium acetate production.

Solid potassium hydroxide flakes will be delivered in bags and mixed with water in a mixing tank, or a 50% potassium hydroxide solution will be purchased and stored in a tank. Emissions from dissolving potassium hydroxide into water are expected to be negligible.

The water produced by the VCE is re-used in the process.

Note all three VCEs exhaust through a single stack.

**** Fermentation**
The concentrated sugar stream will be transferred to the fermentation system, where water, yeast, and enzymes (if needed) are added. The yeast propagation system will provide the yeast feed for the fermentations system. The fermentation process operates semi-continuously. Each of the four fermenters operates as a batch process. When the fermentation cycle in a fermenter is complete, the "beer" from the fermenter is transferred to the beer well. Utilizing all four fermenters and the beer well allows for continuous ethanol production.

The fermentation process will generate VOCs (primarily ethanol) and carbon dioxide. The CO_2 will carry the VOCs out of the fermentation tanks. Emissions from fermenters, yeast propagation system, and beer well will be controlled by a wet scrubber.

The scrubber removal efficiency is estimated to be 98% for VOC and 50% for HAPs, which is consistent with corn ethanol plants.

Emissions were estimated based on engineering calculations and test data from corn dry mill ethanol plants.

**** Distillation and dehydration**
The beer from the beer well will be fed to the beer column, to separate the ethanol from the yeast and residual sugars. The ethanol from the beer column will go to a rectifier column to produce 95% ethanol (190 proof), which will then go through molecular sieves to produce 200 proof ethanol. Emissions from the distillation columns and molecular sieves will be controlled by the wet scrubber. The scrubber removal efficiency is estimated to be 98% for VOC and 50% for HAPs

The solids remaining after fermentation will be pumped from the bottom of the beer column to the WWTP or sold as a product. No emissions are expected from the solids.

Emissions were estimated based on engineering calculations and test data from corn ethanol plants.

**** Ethanol storage**
API has two 1,500 gallon ethanol shift tanks and one 14,830 gallon 200 proof ethanol product tank. Denaturant (typically gasoline) will be stored in a 1,040 gallon storage tank. Unlike most ethanol plants, there will be no storage of denatured ethanol. Instead, denaturant and ethanol will be mixed as they are loaded into the tanker trucks. Emissions from the tanks are not controlled and none of the tanks are subject to NSPS Kb.

The VOC and TAC emissions from the storage tanks were estimated using the EPA Tanks 4.0 program, based on a denaturant throughput of 45,000 gallons per year and an ethanol throughput of 1.125 million gallons per year.

**** Ethanol loadout**
Tank trucks are loaded using submerged loading. Unlike most ethanol plants, API will not pre-mix denatured ethanol and store it on site. Instead, ethanol and denaturant will be blended as the trucks are loaded. Emissions from truck loading are not controlled. At only 3.2 tpy VOC emissions, control is not economically feasible. Emission factors were based on AP-42, Section 5.2.

The permit conditions limit the loadout to 1.17 million gallons per year of total ethanol and denaturant, and 45,000 gallons per year of denaturant. This way, the permittee may loadout some E85 or E70. While denatured ethanol is assumed to be 5% denaturant (gasoline), it is often only 2% or so denaturant. Therefore, the permittee could load out 98% ethanol and some E85 (85% ethanol) or E70 (70% ethanol) so long as the total loadout does not exceed 1.17 million gallons per year and denaturant (gasoline) loadout does not exceed 45,000 gallons per year.

**** Fugitive Emissions From Equipment Leaks**
VOC emissions due to equipment leaks were estimated using the number and type of components expected to be used at the facility and the USEPA document “Protocol for Equipment Leak Emission Estimates,” EPA-453/R-95-017. Total emissions were estimated to be 1.3 tons of VOC per year.

******* Control Technology requirements *******

**** Feedstock pre-treatment**

No add on control is required for the feedstock pre-treatment. The heat exchangers that are an integral part of the VCE's will condense most of the acetic acid that would otherwise be emitted.

**** Potassium acetate production**

No add on control is required for the potassium acetate production. Emissions are expected to be negligible due to the water soluble nature of the chemicals used. Negligible particulate may be generated through handling of the solid potassium hydroxide.

**** Fermentation, distillation, and dehydration**

The wet scrubber is Rule 702(a) BACT for the fermentation, distillation, and dehydration systems. While some corn-to-ethanol plants require use of a reagent (ammonium or sodium bisulfite) to meet the emission limits, API does not expect to use a reagent. No other control devices were evaluated as the wet nature and high CO_2 concentration of the exhaust make other control technologies impractical.

No particulate is expected from the fermentation, distillation, or dehydration systems.

**** Storage tanks**

No add on control is required for the small, fixed roof storage tanks.

**** Ethanol loadout**

Rule 702(a) for loading ethanol into tank trucks is use of submerged fill. Due to the low emission rate resulting from the low production rate, use of a flare is not economically feasible. API expects a production rate of 2,500 gallons of ethanol per day. Assuming a tanker size of 9,000 gallons, API will be able to fill only one tanker every 3.6 days. In addition, the ethanol product tank can hold only 14,830 gallons of ethanol, which is less than two 9,000 gallon tanker trucks full.

Submerged fill also provides adequate control for the toxic air contaminants (TACs) that are VOCs, per Rule 224(2)(c). Emissions of non-VOC TACs should be negligible.

**** Fugitive Emissions From Equipment Leaks**

Fugitive emissions from equipment leaks will be controlled by compliance with NSPS VVa. A few components at the plant may be controlled by compliance with the MON.

**** Sludge dryer**

The emissions from the sludge dryer associated with the WWTP are controlled by a venturi scrubber, condenser, and EUBOILER#1 and EUBOILER#2. Both boilers are located at, and operated by, DPI.

******* NAAQS and PSD increment**

Dispersion modeling for NAAQS and PSD increment was not conducted, as the criteria pollutant emission increases from the API facility are less than the significant levels.

******* TAC impacts (Rule 225) - (see spreadsheets in the file for the TAC analysis)**

TAC emission rates were estimated using a variety of emission factors and engineering calculations.

Acrolein was not a TAC estimated by API for the ethanol fermentation process. However, it has been addressed for every corn-to-ethanol plant as a fermentation byproduct, like acetaldehyde. Therefore, I used data from a corn ethanol plant to estimate emissions for API. Note acrolein has usually not been detected during emission testing at corn ethanol plants, so there is some question as to whether it is actually emitted.

The Rule 227 Table 21 Allowable Emission Rate (AER) was used to determine TAC compliance with Rule 225. All of the compounds met the Table 21 AERs except gasoline, which was dispersion modeled using AERMOD. The following table summarizes the AER results.

TAC	Averaging Time	Allowable Emission Rate (lb/Time)	Proposed Emission Rate (lb/Time)	Percent of Allowable Emission Rate
Acetaldehyde	1 hour	0.27	0.01	3.7%
	24 hour	1.08	0.24	22%
	Month	20	7.44	37%
Acetic acid	1 hour	5	0.1	2%
	8 hour	5	0.8	16%
Acrolein	1 hour	0.0005	0.000257	51%
	Month	0.8	0.19	24%
Ethanol	1 hour	380	1.63	0.4%
	8 hour	380	13	3.4%
Formaldehyde	1 hour	0.0432	0.000623	1.4%
	Month	3.2	0.463	14%
Methanol	1 hour	3.25	1.28	39%

**** Dispersion modeling results**
The gasoline modeling included all gasoline emissions from the source because the SRSL was used: truck loading emissions, the API denaturant storage tank emissions, and the small gasoline storage tank at DPI. The total gasoline impact was found to be 19.4 ug/m3, annual average, which is less than the SRSL of 20 ug/m3 on all off-site property.

Although an emission limit is generally required by AQD guidance when using the SRSL, there are no gasoline emission limits in the permit. Since the sources of gasoline cannot be readily tested, there would be no direct way to verify compliance with the emission limit(s). Instead of an emission limit, the gasoline throughput for the API facility is limited; this limit is the basis for the emission calculations.

**** No Stack Conditions**
Note there are no stacks specified in the permit conditions. There are several reasons for this:

1. Due to the low criteria pollutant emission rates from the project, no NAAQS or PSD increment modeling was done. The heights of the various stacks should not make any difference in the ambient concentrations of the criteria pollutants.

2. For the CO2 scrubber, the Rule 227 AER was used to determine compliance with Rule 225. This method does not take into account the stack parameters. All of the expected emission rates of the TACs are well below the Allowed Emission Rates.

3. For the gasoline modeling, there are really no stacks associated with the emissions. The truck emissions vent from the top of the tanker; there is no fixed stack.

For the gasoline tanks, the “stack” is the vent on top of the tank. A very low flow rate was assumed in the modeling because much of the emissions are breathing losses that occur as the tank heats up. Therefore, the height of the stack is not an important parameter. It also does not matter if the vent points downward.

******* Possible odors (Rule 901)**
Due to the nature of the fermentation process, there is potential for odors to be generated by the facility. The scrubber should control odors from the fermentation. No odor modeling was done due to the complex mix of compounds that could cause odors.

There is a history of odors with DPI. Much of the odor problem has come from the WWTP, which API will be purchasing. With API using the Seal Water Chest Overflow stream as feed for the fermentation process, odors from the WWTP are expected to be reduced. The Seal Water Chest Overflow stream is the primary contributor to the bacterial growth (BOD), and hence the odors, in the WWTP.

*************** KEY ASPECTS OF THE CONDITIONS**
******* Emission limits**
The permit conditions limit the PM emissions from the sludge dryer. These limits were carried over unchanged from the ROP.

The VOC emissions from the equipment controlled by the scrubber are limited to 0.6 lb/hr. No TAC limits are included for this equipment because the expected emission rates are less than 75% of the Rule 227 Allowable Emission Rates.

There may be emission limits in the MON that apply to API. However, based on the company’s preliminary review, no emission limits will apply. Emission limits are included in the conditions as a reference to the MON emission limits that apply to API.

The API facility wide emissions of VOC are limited to 7.83 tons per year. Most of this VOC comes from the equipment controlled by the scrubber, the storage tanks, and the ethanol loadout. The API facility wide PM and PM10 emissions are each limited to 0.4 ton per year. PM2.5 was not evaluated as the facility is in an attainment area and, based on the PM10, the PM2.5 emissions would be no more than 0.4 ton per year.

None of the limits in the API permit are intended to take precedence over any limits in the DPI ROP, with the exception of the sludge dryer that will transfer to API.

******* Production limits**
The permit conditions limit the total ethanol and denaturant loading rack throughput to 1.17 million gallons per year and the denaturant throughput to 45,000 gallons per year. These limits will serve to limit total facility emissions, especially from the product loadout, since ethanol is the primary product produced and ethanol production is the primary emission source.

******* Operational requirements**
The loading of tanker trucks and the filling of the denaturant tank must be done using submerged loading to minimize emissions. The denaturant tank is too small to be subject to Rule 704. However, submerged fill is still required.

******* Control requirements**
The lime storage silo must be equipped with a vent filter.

The sludge dryer is required to be controlled by a venturi scrubber, a condenser, and EUBOILER#1 and EUBOILER#2, except as allowed in the PM/MAP for the sludge dryer. Both boilers are located at, and operated by, DPI. This requirement came from the ROP.

The following emission units must be controlled by the wet scrubber: EUYEASTPROP, EUFERM, EUBEERCOLUMN, EURECTIFIER, and EUMOLSIEVE.

The control requirements of NSPS VVa and the MON are referenced in the conditions. Specific controls required by the MON are not expected to be needed due to the low emissions, small equipment size, and limited amount of equipment in “HAP service”.

******* Stack testing required**
Given the low emission rates expected from the facility, no emission testing is required.

******* Malfunction Abatement Plan**
The permit conditions require API to submit an interim MAP before process start-up, and a revised plan within 270 days of start-up. The revised plan will allow the company to adjust the initial plan based on operating experience.

******* Odor management plan**
The permit conditions require API to submit an interim odor management plan before process start-up, and a revised plan within 270 days of start-up. The revised plan will allow the company to adjust the initial plan based on operating experience. Note DPI has a current consent order that addresses odors from the facility. Provisions of this consent order are expected to be incorporated into the odor management plan.

************ NSPS VVa – VOC leaks from equipment**
The facility will be subject to the NSPS for equipment leaks of VOC. Most of the requirements of the NSPS are included in the conditions.

************ MACT FFFF – Miscellaneous Organic NESHAP**
The facility will be subject to the MON. Most of the requirements of the MON are included in the conditions. Due to the small size of the facility, and the generally low HAP concentrations of the process streams, the MON will primarily require records and notifications. No control requirements will be triggered.

************ Changes made in response to public comments**
The permit conditions were changed as a result of the comments received. A requirement to keep records of the identity of each chemical and raw material used in the ethanol and potassium acetate production processes was added to FGAPIFACILITY. Consumer products, laboratory chemicals, or general maintenance or cleaning materials are exempt from this requirement, but clean up solvents used in the process equipment are not.

RECOMMENDATIONS
District and applicant accept the revised conditions, which properly address applicable requirements. I recommend approval of the permit.